Research Proposal of the Thesis entitled

TO ASSESS THE CORRELATION OF PALATAL RUGAE PATTERNS, LIP PRINT AND FINGER PRINT FOR ASSESSMENT OF MALOCCLUSION IN 10-13 YEARS OF AGE POPULATION- PEADIATRIC FORENSIC ODONTOLOGY

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Introduction:

Dental malocclusion is majorly influenced by genetical and environmental factors; however the weightage of each factor has been a matter of debate in the literature. Since it is evident that genetic factors have an effect on “oro-facial structure” and “craniofacial development” they must be taken into consideration in etiology of malocclusion. Genetical phenotype is an after effect of both familial and surrounding factors, there is indisputable proof for a critical genetic impact in numerous malocclusions. However, the impact of hereditary outcomes differs as per the characteristics and it remains questionable in general.[1]

It is an established scientific fact that the patterns of palatal rugae, lip prints and finger prints are unique and remain unaltered during lifetime by disease, age, trauma, chemicals or for any other reason and are established methods of identification of individual in forensics. All are universal, inimitable and classifiable. The study of palatal rugae is called as palatoscopy/rugoscopy.[2] Lip prints are lines and fissures present as wrinkles and/or grooves usually present in the “zone of transition of human lip”, and their examination is termed as "cheiloscopy".[3] Whereas, “Dermatoglyphics is the study of dermal ridge configurations on palmer and plantar surface of hands and feet”.[4] All the three i.e. rugoscopy, cheiloscopy and dermatoglyphics are important tool for identification of human.

The patterns of palatal rugae are unique for each individual in the oral cavity; hence, they hold the potential for correlation with the malocclusion of the individual.[2] The patterns of palatal rugae have unique patterns orientation and act as critical reference landmarks in the oral cavity for different dental treatments. The orientation of palatal rugae forms by twelfth to fourteenth week of intra-uterine development and remain static throughout the life. The design and structure of the palatal rugae remain unaltered and in case of any destruction they can be reproduced exactly on the same region.[5] It is an established fact that the rugae and dentition both related developmentally and functionally. It was reported that in both ontogenesis and phylogenesis processes, rugae and dentition have a common precursor the relationship between the two has not been conclusively established.[6] Such a relationship, if any exists, could be an important tool for the prediction of any malocclusion.

"Lip prints are established at a very early period in comparison to dental relation. It has been proved that lip prints are analogous to thumb prints. Studies have been done to determine the correlation between thumb prints and dental malocclusion. Lip prints can also be used for personal identification as well as sex determination. Establishing a correlation between dental malocclusion and lip prints would benefit the clinician and can also provide additional information on individual personal identity.

In human beings, the time taken for the development of lip and palate till its completion are approximately same as that of development and completion of dermal ridges. Thus, the genetic and environmental factors which are associated with dental malocclusion might also get recorded in dermal ridges. This is the basis of comparison of dental diseases or malocclusion with that of "Dermatoglyphics" which is the study of epidermal ridges and the patterns seen on the palm." The patterns of dermatological ridges is first seen during twelfth week of intrauterine life and are usually completed by twenty fourth week of intrauterine life. They remain static throughout life without any change except in size.[7] Extensive researches are available to relate dermatoglyphics and dental diseases, but most of them seem to be missing on malocclusion.

Dental malocclusion is usually genetically controlled and it is one of the regularly seen dental problems. Palate, lips, fingers and alveolus develop during the same embryonic period but the comparative assessment of all three types of malocclusions in relation to the lip prints, palatal rugae and finger prints has not been done in the same subjects as per our database searches of EBSCO, MEDLINE, PUBMED, UPTO DATE and GOOGLE SCHOLAR. Hence, present study was designed with the objectives to evaluate any correlation between malocclusion and different patterns of palatal rugae, lip prints and finger prints which could give us early clue about the malocclusion a person may develop in

future and help in early interventions for achieving better orofacial structure. This study would also be helpful from forensic and criminal investigation point of view by correlating different findings of the present study.

Need for the study

Present study was designed with the objectives to determine if any relation exists between malocclusion and patterns of palatal rugae, lip prints and finger prints which could give us early clue about the type of malocclusion that a person may develop in future and help in early interventions for achieving better orofacial structure.

Objectives of the study

1. To discover if the palatal rugae, lip prints & finger prints have characteristic patterns in subjects having Angle's Class-I malocclusion, Angle's Class-II malocclusion & Angle's Class-III malocclusion.
2. To find out the most common patterns of palatal rugae, lip prints & finger prints in the study population.
3. To establish if any difference exists in the patterns of palatal rugae, lip prints & finger prints between male & female population.
4. To rule out if any correlation exists between the different parameters used in the study.

Hypothesis

1. There is no specific characteristics patterns of palatal rugae, lip prints & finger prints in subjects having Angle's Class-I malocclusion, Angle's Class-II malocclusion & Angle's Class-III malocclusion.
2. There will be no common patterns of palatal rugae, lip prints & finger prints in the study population.
3. There will be no difference exists in the patterns of palatal rugae, lip prints & finger prints between male & female population.
4. There will be no correlation exists between the different parameters used in the study.

No statistical correlation will be found between rugae pattern, lip print and finger print with malocclusion.

Research Methodology

The current study will be accomplished out in the Department of Paedodontics & Preventive Dentistry, Karnavati school of Dentistry, Uvarsad, Gandhinagar. Ethical clearance will be acquired from the Ethical Committee, Karnavati University.

Minimum sample size required for the statistically significant result was ruled out using the formula n = N/1+Ne2 Where, n = Sample Size, N = Population of dental patients in the age group of 10-13 years in who will visit the Peadiatric and preventive dentistry Department, Karrnavati school of Dentistry, Uvarsad, Ghandhinagar, e = 0.05 at 95% CI. Total Sample size 120 was arrived, Group sample sizes of 30 in group I (class I malocclusion), 30 in group II (class II div I malocclusion), 30 in group III (class II div. II malocclusion) and 30 in group IV (class III malocclusion) was derived.

Recoding of dental occlusion:[8]

Type of dental malocclusion was recorded in specially designed Proforma clinically according to Angle's classification of dental malocclusions.

Recording palatal rugae patterns:[9]

The Impression will poured with dental stone and produce positive replica of rugae pattern and marked in proforma. The type of palatal rugae depending on its shape were noted on the format using Thomas and Kotze classification of palatal rugae patterns.

Recording of lip prints:[10]

A lead free dark-coloured organic lipstick was applied on upper and lower lips uniformly with one stroke. Impression was made on a strip of transparent

cellophane tape on the glued portion that was then stuck on to a specifically designed format. Iimpression was later visualized using 5x magnifying lens. The number of lines and furrows present, their length, branching and combinations were investigated and categorized according to Suzuki and Tsuchihashi classification which were recorded on a specially designed proforma. The lipstick was then wiped off from the lips using tissue paper.

Recording of fingerprints:[11]

The participant's hands were first washed with soap and water and then dried. Then, each finger was rolled on the non-toxic duplicating ink pad using rolling impression technique, so that the whole fingerprint pattern area was evenly covered with ink. Ink was uniformly spread from one edge of the nail to the other and from the crease of the first joint to the tip of the finger. When making the rolled impression, the side of the finger bulb (plane of the nail at a right angle to the paper) was placed on a specially designed proforma . Care has been taken to ensure that the bulb of each finger, from tip to below the first joint, was rolled evenly. Care was taken to lift each finger up after rolling to avoid soiling. All ten fingerprints of a single subject was studied under adequate light and 5x magnification and classified using Henry classification into three basic types according to shape, i.e., whorls, loops, and arches.

Scope and Limitation of the study

We can increase the geographic area for the study population and increase age group for the data collection.

Limitation of the study is selected age group and population selected from particular geographic area of the study.

Reasearch would also be helpful from forensic and criminal investigation point of view by correlating different findings of the study.

Literature Review

Oliveira CN (2021)[12] evaluated the lip charecteristics and verify the labial petterns among the university students to identify the genders. It was observed that type II lip pattern is most common in the studies population.

Sharma T (2020)[13] evaluated the reliability of Rugoscopic and Dermatoglyphic patterns for gender identification. They observed that arch pattern is more common in males and loop pattern is more common in females. Straight pattern is more common in males and circular pattern is more common in females.

Nadeem S (2019)[14] evaluated the lip print pattern in female population of Punjab, Pakistan region. It was observed that Type I is more prevalent followed by type II,

IV, III, and I' lip print patterns. The least common finger print pattern was type V pattern.

Reddy KV (2018)[15] evaluated the finger print pattern in caries and caries free individuals. They observed that whorl pattern is more in caries free group and loop pattern is more in caries group.

Kasuma N (2018)[16] evaluated the palatal rugae pattern in Indonesian population. They observed that there is a positive correlation in the observation of palatal rugae in parents and their off springs.

Mala S (2017)[17] evaluated the association of finger prints, lip prints and palatal rugae in three successive generations and reported that 30 percent of thumb print and 10 percent lip print repetition was observed in three generations.

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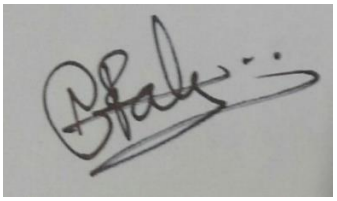

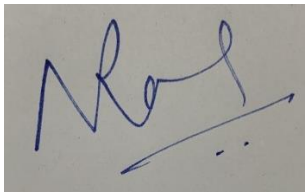

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